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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/749,908	12/29/2000	Hayden C. Cranford	RAL920000097US1/1963-7408	6858

25299 7590 06/28/2004

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EXAMINER

PATHAK, SUDHANSHU C

ART UNIT	PAPER NUMBER
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2634

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DATE MAILED: 06/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/749,908	Applicant(s) CRANFORD, HAYDEN C.	
	Examiner Sudhanshu C. Pathak	Art Unit 2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on December 29th, 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on December 29th, 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-to-32 are pending in the application.

Drawings

2. New corrected drawings are required in this application because **all** the drawings submitted are not legible, and it is extremely difficult to read the element descriptions and element identifiers. Furthermore, the drawings with circuit components are so small that it is not possible to understand the operation of the circuit itself. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally **limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited.** The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Objections

4. Claims 3-8, 18-22 & 25-32 are objected to because of the following informalities:

The claims limitations are designated sequentially i.e. e, f, g, ...,j, but the claims mentioned above are all dependent on claim 1 comprising multiple limitations (a-c), therefore adding **an additional limitation** to claim 1, as the dependent claims do, should be designated **"d"** since the claims 3-8, 18-22 & 25-32 are parallel to one another. Therefore, the limitations disclosed in claims 3-8 should all be designated as **"d"**. Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 30-32 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. **Claims 30-32 are substantially duplicate of claims 24-26 respectively.** When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-2, 4-5, 13-16, 19, 21, 23, 26, 28-29 & 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (6,125,415) in view of Cranford, Jr. et al. (6,332,166).

Regarding to Claims 1-2, 4-5, 13-16, 19, 21, 23, 26, 28-29 & 32, Liu discloses a control system for allowing the end user to control the level of a signal transmitted from the host to a transmission medium to optimize the transmitter performance (Abstract, lines 1-7 & Column 4, lines 12-20 & Fig.'s 3-5). Liu further discloses the controller means is configured to modify the characteristics of the signal transmitted through the transmission medium including the peak-to-peak voltage of the signal (Column 4, lines 12-67 & Column 3, lines 44-52 & Column 5, lines 15-35 & Column 8, lines 35-47). Liu further discloses a line driver coupled to the transmission media, which amplifies the signals to, levels appropriate for the cable and which launches the signal into the transmission medium (Abstract, lines 7-14 & Column 8, lines 8-22 & Fig. 2, element 210 & Claim 1). Liu further discloses the control system modifies the bias of the driver so as to adjust the magnitude of the transmitted signal to cancel the effects of the transmission medium and controlling the transmission signal eye pattern (Fig. 2-5 & Column 7, lines 5-67 & Column 8, lines 35-46 & Claim 9). However, Liu does not disclose a transversal filter coupled to the transmission media, the filter having programmable filter coefficients and the filter for altering the

frequency response of the driver to match the frequency response of the transmission media.

Cranford discloses an adaptive interface and method to facilitate the connection of multiple devices using multiple transmission media (Abstract, lines 1-10 & Fig. 1 & Column 1, lines 20-65). Cranford further discloses the adaptive interface to include programmatically controlled filters (transversal filter), coupled to transmission media, comprising a series of switchable elements connected to the cabling to mirror the amplitude attenuation and phase shift of the transmission media (Abstract, lines 11-17 & Fig. 2, 3 & Column 4, lines 22-67 & Column 5, lines 50-62 & Claims 7, 10 & Column 3, lines 9-38). Cranford also discloses a method for implementing the filters as an equalizer and modifying the coefficients of the filter interface so as to minimize the bit error rate (Abstract, lines 20-41 & Fig.'s 4A-B & Column 5, lines 3-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Cranford teaches an interface, comprising an transversal filter for equalizing the signal transmitted over the transmission media so as to minimize bit error rate and thus inter-symbol interference, so as to implement the interface on multiple transmission media and this can be implemented in the system as described in Liu after the line driver component to prevent inter-symbol interference on the signal transmitted over the transmission media. Furthermore, the control system as described in Liu can be implemented so as to transmit constant power over the transmission media, thus the control system/driver as described Liu in

conjunction with the equalizer as described in Cranford satisfies the limitations of the claims.

9. Claims 3, 6, 9-12, 17-18, 20, 22, 24-25, 27 & 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (6,125,415) in view of Cranford, Jr. et al. (6,332,166) in further view of Farjad-Rad (PG Pub No. US 2001/0043649).

Regarding to Claims 3, 6, 12, 17-18, 20, 24-25, 27 & 30-31, Liu in view of Cranford discloses a programmable driver/equalizer for overcoming inter-symbol interference and other transmission medium impairments in a variety of transmission media comprising a controllable driver and a transversal filter equalizer as described above. However, Liu in view of Cranford does not disclose switching the transversal filter and the controllable drivers off the high capacitance nodes when the programmable filter coefficients are inactive, and further comprising means for storing a present data input signal bit and a history of at least two past data signal input bits in the transversal filter.

Farjad discloses implementing an analog N-tap FIR filter as an equalizer that can be implemented at either the transmitter or receiver end so as to reduce inter-symbol interference (Abstract, lines 1-11 & Fig. 1 & Fig. 5 & Page 1, Paragraph 7-14 & Page 3, Paragraph 41). Farjad also discloses logic means for switching the transversal filter and controllable drivers off high capacitance nodes when the programmable filter coefficients are inactive (Fig's. 5 & 6 & Page 3, Paragraphs 50-56). Farjad further discloses the filter comprising mean for storing a present data input signal bit and a history of at least two past data signal input bits in the transversal filter (Fig. 5,

element 12 & Page 3, Paragraphs 46-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Farjad teaches implementing an analog FIR filter as an equalizer with a differential amplifier and switching the filter and driver off high capacitance nodes when the programmable filter coefficients are inactive and also to include means to store present data and a history of at least past two data values, and furthermore, even though the equalizer as described in Farjad is implemented at the receiver end it can be implemented at the transmitter as described in Liu in view of Cranford. The equalizer as described in Farjad can be implemented as an equalizer in the transmitter as described in Liu in view of Cranford, thus satisfying the limitations of the claim.

Regarding to Claims 9-11 & 22, Liu in view of Cranford discloses a programmable driver/equalizer for overcoming inter-symbol interference and other transmission medium impairments in a variety of transmission media comprising a controllable driver and a transversal filter equalizer as described above. However, Liu in view of Cranford does not disclose the transversal filter to be an FIR filter, with a transfer function as described as a summation of a constant multiplied by a sequence in time samples and the driver/equalizer wherein the driver set comprises weighted current drivers.

Farjad discloses an equalization filter being a multi tap FIR filter, wherein each data inputted in the filter, its value and its previous N-1 data values are sampled and held, and modulated by appropriate constant values i.e. filter tap weights and added or subtracted (Page 1, Paragraph 8-9 & Page 3, Paragraph 46-49 & Fig. 5). Farjad

further discloses the controllable driver set comprising weighted current drivers (Fig. 6 & Page 3, Paragraphs 53-56). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention that Liu in view of Cranford in further view of Farjad satisfies the limitations of the claims.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (6,125,415) in view of Cranford, Jr. et al. (6,332,166) in further view of Burlage et al. (4,374,426).

Regarding to Claim 7, Liu in view of Cranford discloses a programmable driver/equalizer for overcoming inter-symbol interference and other transmission medium impairments in a variety of transmission media comprising a controllable driver and a transversal filter equalizer as described above. However, Liu in view of Cranford does not disclose the programmable driver/equalizer further comprising a shift register elements in the transversal filter providing time delays in processing data input signal.

Burlage discloses a high-speed digital equalizer used to equalize a channel with digital circuits prior to data transmission (Abstract, lines 1-10). Burlage further discloses implementing shift register elements in the transversal filter providing time delays in processing the input data signal (Fig's. 2, 3, element 24 & Column 2, lines 5-15, 55-68 & Column 3, lines 18-68). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Burlage teaches implementing an transversal filter equalizer using shift register elements and this can be implemented as the equalizer as described in Liu in view of Cranford, providing a

simple hardware circuitry and minimizing the complexity of the design, so as to satisfy the limitations of the claims.

11. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Liu (6,125,415) in view of Cranford, Jr. et al. (6,332,166) in further view of Burlage et al. (4,374,426) in further view of Woodcock et al (Computer Dictionary, 2nd Edition, 1994, Microsoft Press).

Regarding to Claim 8, Liu in view of Cranford discloses a programmable driver/equalizer for overcoming inter-symbol interference and other transmission medium impairments in a variety of transmission media comprising a controllable driver and a transversal filter equalizer as described above. However, Liu in view of Cranford does not disclose the programmable driver/equalizer further comprising a buffer and a latch means in a transversal filter for storing data input signal in time sequence.

Burlage discloses a high-speed digital equalizer used to equalize a channel with digital circuits prior to data transmission (Abstract, lines 1-10). Burlage further discloses a buffer and flip-flop means in a transversal filter for storing data input (Fig. 5, elements 25, 20 & Column 3, lines 9-50, 57-68 & Column 4, lines 1-5 & Column 5, lines 1-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Burlage discloses implementing the transversal filter using data buffers and flip-flops and this can be implemented as the equalizer as described in Liu in view of Cranford, providing a simple hardware circuitry and

minimizing the complexity of the design. However, Burlage does not specifically disclose a latch.

Woodcock discloses a flip-flop as a specific kind of a latch (Page 233, "latch"). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Woodcock teaches that a flip-flop is a particular type of a latch, thus Liu in view of Cranford in further view of Burlage in further view of Woodcock satisfies the limitation of the claims.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (703)-305-0341. The examiner can normally be reached on M-F: 9am-6pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin can be reached on (703)-305-4714. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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